SALOME ASANIDZE [1], NINO JALAGHANIA [2]

THE COMPLEXITIES OF OBESITY: ADDRESSING ROOT CAUSES AND HEALTH RISKS

[1]Tbilisi State University, Faculty of Medicine; [2]TSMU The first University Clinic; Tbilisi, Georgia

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სალომე ასანიძე [1], ნინო ჯალაღანია [2]

სიმსუქნის სირთულეები: ძირეული მიზეზების და ჯანმრთელობის რისკების მოგვარება

[1]თბილისის სახელმწიფო უნივერსიტეტი, მედიცინის ფაკულტეტი;
[2]თსსუ პირველი საუნივერსიტეტო კლინიკა; თბილისი, საქართველო

რეზიუმე

მსოფლიოში სიმსუქნე გლობალური ჯანმრთელობის კრიზისად იქცა, რომელიც მილიონობით ადამიანს, განსაკუთრებით ბავშვებს აზარალებს და სხვადასხვა ქრონიკული დაავადების მანიფესტირების წინაპირობას წარმოადგენს. აღსანიშნავია, რომ მომავლის პროგნოზი გაცილებით უარესია, ვიდრე დღევანდელი მოცემულობა. სტატია იკვლევს როგორ გავლენას ახდენს გენეტიკა, გარემო, კვების ოჯახური პატერნი და ობეზოგენები ჭარბწონიანობაზე. მნიშვნელოვანია, რომ სიმსუქნე არ არის მხოლოდ ადამიანის არჩევანი, ჭარბი კვების ან გენეტიკური მიდრეკილების შედეგი, არამედ მრავალი ფაქტორის გავლენით გამოწვეული კომპლექსური პრობლემა. განხილულია პრევენციისა და მკურნალობის სტრატეგიები, სიმსუქნის გამომწვევი ძირეული ფაქტორები და მართვის გზები.

The prevalence of obesity has tripled globally since 1975, with 39% of adults overweight and 13% obese. Alarmingly, childhood obesity rates have also surged, with 340 million children and adolescents classified as overweight or obese. Geographical disparities also highlight the global nature of the obesity crisis. High-income countries, such as the United States, have long reported high obesity rates, with over 42% of American adults classified as obese as of 2020. The healthcare costs associated with treating obesity-related illnesses - such as diabetes, cardiovascular diseases, and cancer - place immense strain on healthcare systems. In the United States alone, obesity-related medical costs are estimated to exceed $170 billion annually.

While obesity is influenced by genetic predispositions, research indicates that genetic factors account for only 25-40% of an individual's weight. Studies on twins raised in different environments highlight the significant impact of lifestyle and dietary patterns. For example, families with a history of obesity often perpetuate poor eating habits across generations, underscoring the interplay between genetics and behaviour. Initially, genetics was thought to be the sole cause of obesity, but studies have shown that for a condition to become genetically manifest, it requires the methylation of around 1,800 genes. This means that this predisposition must exist in the family for about 1,800 years before it becomes a genetic pathology. Specific genes associated with increased body mass index (BMI) and fat distribution. For instance, variations in the FTO gene are linked to higher obesity risk. Additionally, recent research has identified the SMIM1 gene, where certain variants are associated with reduced energy expenditure and increased obesity risk.

Modern lifestyles contribute significantly to the obesity epidemic. Increased consumption of processed foods high in sugar and fat, combined with decreased physical activity, creates an imbalance in calorie intake and expenditure. The prevalence of ultra-processed foods, high in sugars and unhealthy fats, has been linked to increased calorie consumption and weight gain. Addressing these industry practices is

crucial for combating obesity. Endocrine disruptors, or obesogens, affect the differentiation of adipocytes and can act as appetite increasers, damaging the microbiome. All diseases, including obesity, start with disturbances in our microbiota, which ultimately influences metabolism. They stimulate the secretion of lipid-pro-inflammatory cytokines. Obesogens can be found in everything, even in furniture that contains flame-retardant chemicals, which have been proven to be obesogenic. Phytoestrogens, such as those found in women's moisturizing creams and shampoos, are also obesogens. One common phytoestrogen is beer, typically consumed by men, which, especially after the age of 40, contributes to the growth of abdominal fat and breast tissue in men. As androgen levels naturally decrease with age, the effects become more pronounced.

Psychological factors, such as stress and emotional eating, play a critical role in obesity. Research indicates that children exposed to stressors like bullying or family conflict are more likely to develop unhealthy eating patterns, leading to weight gain. Stress is a significant driver of unhealthy eating patterns, often leading to the consumption of high-calorie, low-nutrient "comfort foods." Individuals with chronic stress are more likely to develop obesity due to increased cravings for sugary and fatty foods. Obesity is often caused by the dietary behaviour prevalent in a family. For instance, when a mother is overweight, she passes on a particular eating pattern to her child, which gradually leads to the child gaining weight. There may be a genetic predisposition to accumulating more fat in specific areas of the body, but this factor alone is not decisive.

Contrasting EBM and CIM: Energy Balance Model: Calories in vs. calories out. The EBM posits that weight gain results from an imbalance between energy intake and energy expenditure. When caloric intake exceeds the body's energy needs, the surplus is stored as fat, leading to obesity.

Carbohydrate-Insulin Model: The CIM suggests that the consumption of high-glycemic-load carbohydrates leads to increased insulin secretion, promoting fat storage and weight gain. This model challenges the traditional calorie-centric view, proposing that hormonal responses to different macronutrients leads to obesity. if a person consumes only proteins and fats, the carbohydrate load will be minimal. This is why the keto diet is effective, during a keto diet, the carbohydrate load is nearly zero. The greater the amount of carbohydrates consumed, the higher the insulin production. On a keto diet, insulin is not produced in excess, preventing lipogenesis (the creation of fat cells). Thus, carbohydrate intake is directly linked to weight gain, as modern diets are filled with obesogens - foods high in carbohydrates. The reason for the high carbohydrate content in food is simple: carbohydrates are cheap, which means manufacturers can cut costs.

Obesity also exacerbates conditions like osteoarthritis, gastrointestinal disorders, cardiovascular system issues, and sleep apnoea. During sleep, abdominal pressure increases, and breathing is interrupted, followed by strong inhalations to compensate. However, there are brief moments when brain oxygenation is reduced, which increases the risk of dementia as one ages. Often, patients who are chronically overweight and develop new conditions fail to associate them with their weight because the symptoms are new. However, every individual's body has a set of resources that can be depleted and in individuals with persistent obesity, every other disease and complication will always be linked to their excess weight.

Prevention remains the most effective approach to tackling obesity. Lifestyle modifications, including balanced diets, regular physical activity, and stress management, are crucial. Additionally, bariatric surgery and anti-obesity medications may be considered for severe cases, though these options come with risks and limitations. The best long-term approach to treatment is lifestyle modification, including dietary changes, physical activity, and maintaining mental strength and motivation. Antibiotic-obesogenic medications work only while they are being used - when the injections stop, the lost weight

returns. Bariatric surgery is another option, but it should be considered only when other treatment methods fail. A potential complication of bariatric surgery is the dumping syndrome, where food passes from the stomach to the intestines too quickly due to osmotic pressure, leading to incomplete digestion.

The future outlook is far worse than the current situation, so preventive measures must be taken now. We can develop more effective prevention and treatment strategies, ultimately improving public health outcomes. For individuals already affected by obesity, effective treatment strategies must combine dietary and physical activity interventions with medical and psychological support. Advances in medical therapies, including bariatric surgery and anti-obesity medications, offer hope for those with severe obesity but must be used judiciously alongside lifestyle changes.

References:

1. Flegal KM, Graubard BI, Williamson DF, Gail MH. Cause-Specific Excess Deaths Associated With Underweight, Overweight, and Obesity. *JAMA.* 2007;298(17):2028–2037. doi:10.1001/jama.298.17.2028
2. Flegal KM, Carroll MD, Kit BK, Ogden CL. Prevalence of obesity and trends in the distribution of body mass index among US adults, 1999-2010. JAMA. 2012; 307(5):491-497. Doi:10.1001/jama.2012.39
3. Janesick AS, Blumberg B. Obesogens: An emerging threat to public health. Am J Obstet Gynecol. 2016;214(5):559-565. Doi:10.1016/j.ajog.2016.01.182
4. Ludwig DS, Ebbeling CB. The Carbohydrate-Insulin Model of Obesity: Beyond "Calories In, Calories Out". JAMA Intern Med. 2018;178(8):1098-1103. Doi:10.1001/jamainternmed.2018.2933

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SUMMARY

Obesity has emerged as a global health crisis, affecting millions across all age groups and leading to severe chronic diseases such as diabetes, cardiovascular conditions, and liver dysfunction. Beyond individual behaviours like overeating, obesity is influenced by genetic predispositions, environmental factors, psychological patterns, and socio-economic circumstances. This article delves into the root causes of obesity, exploring its multifaceted nature, including its links to family eating habits, industrial food production, and the underestimated role of obesogens. It also examines strategies for prevention and treatment, emphasizing the importance of lifestyle modifications and broader societal changes. Through a comprehensive analysis of current research and expert perspectives, this article aims to contribute to a more holistic understanding of obesity and inform effective interventions.

Keywords: Obesity, obesogens, health risks, energy balance model, carbohydrate-Insulin model